

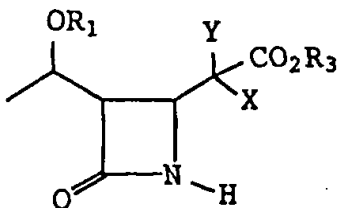
Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

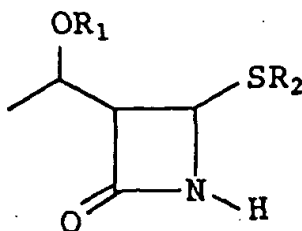
Listing of claims:

Claims 1-19 (cancelled)

20 (new). A process for synthesizing a 4-substituted azetidinone derivative representative by the formula [3]:



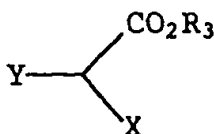
which comprises reacting an azetidinone derivative represented by the formula [1]:



wherein OR₁ is a protected hydroxyl group; R₂ is a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group or a substituted or unsubstituted aromatic group, in the presence of:

(a) a copper compound selected from the group consisting of copper oxides, copper halides, salts of copper with aliphatic and aromatic carboxylic acids, salts of copper with mineral acids and complexes of cuprous halides, or

(b) a mixture of zinc with at least one of said copper compounds with an ester compound represented by the formula [2]:



wherein CO₂R₃ is an esterified carboxyl group, selected from the group consisting of tri-substituted silyl carboxyl ester, tri-substituted silyl lower-alkyl carboxyl ester, aromatic heterocyclic carboxyl ester, lower alkyl carboxyl ester, lower alkenyl carboxyl ester, aryl lower-alkyl carboxyl ester, aryl carboxyl ester, and phthalidyl carboxyl ester;

wherein X and Y are the same or different and represent individually a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted alkenylthio group, a substituted or unsubstituted aralkylthio group, a substituted or unsubstituted arylthio group, a substituted or unsubstituted alkyloxy group, a substituted or unsubstituted alkenyloxy group, a substituted or unsubstituted aralkyloxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted silyloxy group, a substituted or unsubstituted heterocyclic group, a substituted or unsubstituted heterocyclic-thio group, a substituted or unsubstituted heterocyclic-oxy group, a substituted or unsubstituted acyl

group, a carboxyl group, an alkyloxycarbonyl group, an alkenyloxycarbonyl group, an aralkyloxycarbonyl group, an aryloxycarbonyl group, a thiocarboxyl group, an alkylthiocarbonyl group, an alkenylthiocarbonyl group, an aralkylthiocarbonyl group, an arylthiocarbonyl group, a substituted or unsubstituted aminocarbonyl group, a substituted or unsubstituted amino group, a hydrogen atom or a halogen atom, or, when taken together with the carbon to which they are attached, form a substituted or unsubstituted cycloalkan-2-on-1-yl group;

wherein any substituents on R_2 are selected from the group consisting of halogen, lower alkyl, monocyclic or polycyclic alkyl, lower alkoxy, carboxyl, amino, nitro, cyano, hydroxy, aryl of 6 to 10 carbon atoms and aralkyl groups of 7 to 24 carbon atoms;

wherein any substituents on X and Y are selected from the group consisting of halogen, carboxyl, formyl, nitro, cyano, hydroxyl, amino, lower alkyl, monocyclic and polycyclic alkyl, lower alkenyl, aryl of 6 to 10 carbon atoms, aralkyl of 7 to 24 carbon atoms, alkylthio, alkenylthio, aralkylthio, arylthio, alkyloxy, alkenyloxy, aralkyloxy, aryloxy, alkylsulfinyl, arylsulfonyl, carbamoyl, carbamoyloxy, imino-lower-alkyl, imino-lower-alkylamino, acyloxy, silyloxy, heterocyclic, heterocyclic-thio, heterocyclic-oxy, acyl, carboxyl, alkyloxycarbonyl, alkenyloxycarbonyl, aralkyloxycarbonyl, aryloxycarbonyl, alkylthiocarbonyl, alkenylthiocarbonyl, aralkylthiocarbonyl, arylthiocarbonyl and a substituted or unsubstituted aminocarbonyl group.

21 (new). The process of claim 20 for synthesizing a 4-substituted azetidinone derivative represented by the formula [3], wherein said process further comprises the steps of treating an ester

compound represented by the formula [2] with an alkali metal hydride to convert to the corresponding metal enolate, followed by reaction with an azetidinone derivative represented by the formula [1] in the presence of a copper compound.

22 (new). The process of claim 20 wherein the ester compound represented by the formula [2] is a halogenated acetic acid ester, a malonic acid ester, a 2-alkylmalonic acid ester, a 2-halogenated malonic acid ester, a 2-alkyl-acylacetic acid ester or a cycloalkan-2-on-1-carboxylic acid ester.

23 (new). The process of claim 20 wherein the ester compound represented by the formula [2] is a bromoacetic acid ester, a malonic acid ester, a 2-methylmalonic acid ester, a 2-fluoromalonic acid ester, a 2-methylacetoacetic acid ester or a cyclohexan-2-on-1-carboxylic acid ester.

24 (new). The process of claim 20 wherein the copper compound is a cuprous bromide dimethylsulfide complex.